Review 1S position, velocity, acceleration

motion along a line (1 dimension)

position = $x(t)$

velocity = $v(t) = \frac{dx}{dt}$

acceleration = $a(t) = \frac{dv}{dt} = \frac{d^2x}{dt^2}$

speed = $|v| = \sqrt{v^2}$

describe motion: moving left $v<0$

right $v>0$

at rest $v=0$

Mar 16-9:46 AM

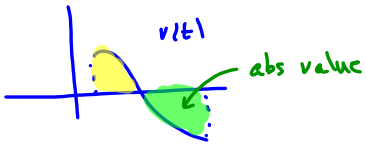
Find position from velocity

$\int_a^b v(t)\,dt$ = displacement

Final position = $x(a) + \int_a^b v(t)\,dt$

$x(b)$

total distance $\int_a^b |v(t)|\,dt$




Mar 16-10:41 AM

motion in a plane (2 dimensions)

position $\hat{r}(t) = \langle x(t), y(t) \rangle$ parametric

vel. $\hat{v}(t) = \langle x'(t), y'(t) \rangle$

accel. $\hat{a}(t) = \langle x''(t), y''(t) \rangle$

slope of $\hat{v}(t) = \frac{dy/dt}{dx/dt}$

speed = $|\hat{v}| = \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}$

Mar 16-10:46 AM

total distance = $\int_a^b \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\,dt$

Mar 16-10:49 AM